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HIV and STI Prevalence and Risk Factors Among Male Sex Workers and Other Men Who Have Sex With Men in Nairobi, Kenya

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Abstract

Previous surveys of men who have sex with men (MSM) in Africa have not adequately profiled HIV status and risk factors by sex work status. MSM in Nairobi, Kenya, were recruited using respondent-driven sampling, completed a behavioral interview, and were tested for HIV and sexually transmitted infections. Overlapping recruitment among 273 male sex workers and 290 other MSM was common. Sex workers were more likely to report receptive anal sex with multiple partners (65.7% versus 18.0%, $P < 0.001$) and unprotected receptive anal intercourse (40.0% versus 22.8%, $P = 0.005$). Male sex workers were also more likely to be HIV infected (26.3% versus 12.2%, $P = 0.007$).

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Keywords

men who have sex with men; male sex work; HIV prevalence; STI prevalence; sexual behavior; Africa

INTRODUCTION

Heterosexual transmission is the primary mode of HIV infection in sub-Saharan Africa, but there is increasing recognition of the role of men who have sex with men (MSM) in transmission dynamics. Globally, MSM are more likely to become infected with HIV than the general population because of sexual behaviors and vulnerabilities that increase their risk of acquiring or transmitting HIV.[1] MSM are also at increased risk for HIV in the developing world, particularly in Africa and specifically Kenya, where sexual intercourse between men remains illegal and discrimination persists, thus limiting access to targeted HIV prevention interventions.[2] This situation is compounded by general lack of data in Africa on MSM prevalence of HIV, sexually transmitted infections (STIs), risk factors, and health seeking behaviors.

HIV prevalence rates reported among MSM in Africa are generally higher than in the general population of men.[3,4] In Kenya, HIV prevalence was 24.6% among a 2007 cohort study of 275 MSM in Mombasa, of whom 74% reported selling sex for money or goods in the previous 3 months.[5] Time–venue surveys of MSM who sell sex in Mombasa reported high-risk sexual behaviors, including unprotected anal sex and high numbers of sexual partners.[6] High rates of HIV incidence have also been reported among nonprobability MSM cohorts in both Nairobi (10.9 per 100 person-years)[7] and Mombasa (8.6).[8] To date, however, there have been no probability-based estimates of HIV prevalence and associated risk factors among MSM in Kenya.

In 2010, the Kenya National HIV/AIDS and STI Control Programme (NASCOP), the US Centers for Disease Control and Prevention (CDC), the Population Council, and other collaborators implemented the first surveillance surveys of most-at-risk populations in Nairobi.[9] We report here results from a cross-sectional survey to estimate the prevalence of HIV, STIs, and sexual behavior among MSM. To our knowledge, this was the first study in Africa that allowed disaggregating data between MSM who sell sex and those who do not.

METHODS

Study Design and Setting

The cross-sectional survey was conducted from July to September 2010 at the NASCOP Voluntary Counselling and Testing (VCT) Center in Nairobi. Participants were recruited using respondent-driven sampling (RDS), a probability-based peer recruitment sampling method.[10–13] Recruitment started with 6 “seeds” who were asked to recruit 3 MSM peers from their personal social networks. Seeds were identified through formative research (focus group discussions and key informants) and diversified on age, sexual identity, and marital status. Seeds and subsequent recruits were compensated for up to 3 recruits, until sample size was achieved.

Study Participants

Eligibility and screening criteria included being aged 18 years or older, a resident of Nairobi or surrounding communities, and having had anal or oral sex with a man within the last 6 months.

Data Collection

Behavioral surveys were conducted following informed consent by a nurse counselor to eligible participants using handheld computers, and took approximately 35–50 minutes to complete. Survey questions included demographics, alcohol and drug use, sexual risk and prevention behaviors, HIV testing, and experience with violence and discrimination. RDS Coupon Manager software was used to track recruitment and compensation. Electronic fingerprint recognition software was used to identify duplicate recruits, confirm correct ownership of a recruit's coupon using a matched identification number, and to identify recruits during follow-up.

Laboratory Methods

HIV testing was conducted using a parallel algorithm with Determine and Unigold rapid tests (Determine; Abbott Laboratories, Abbott Park, IL; Unigold; Trinity Biotech plc, Bray, Ireland), and Bioline (Standard Diagnostics Inc., Gyeonggi-Do, South Korea) as a tiebreaker for discordant results. Rectal and urine samples were collected from all participants and tested for genital and rectal chlamydia and gonorrhea using Roche Amplicor test kits (Roche Molecular Diagnostics, Pleasanton, CA). Rectal swabs that tested positive for gonorrhea were confirmed using the Aptima2 ComboAssay (Gen-Probe, San Diego, CA). For syphilis, venous blood was collected and tested using the rapid plasma reagent assay, and positives were confirmed with the *Treponema palladium* hemagglutination assay test (Human Diagnostics Worldwide, Wiesbaden, Germany). STI tests and HIV polymerase chain reaction were conducted for quality assurance at the University of Nairobi Institute of Tropical and Infectious Diseases laboratory. Gen-Probe confirmatory gonorrhea testing of positive results was performed at the Mombasa STI Laboratory.

Statistical Analysis

We compared sociodemographic and behavioral characteristics, exposure to violence and discrimination, HIV testing, and HIV and STI prevalence between MSM who did not report selling sex and the MSM who either (1) sold sex in the past 2 months and/or (2) reported sex work as their “main” occupation. MSM were classified as having sold sex if they reported sex work as their “main occupation” or if they reported selling sex in the past 2 months (but not as a primary occupation). IBM SPSS Statistics (version 19), Stata (version 10.1; StataCorp, College Station, TX), and SAS (Version 9.1; SAS Institute Inc, Cary, NC) were used for management and analysis of crude data. RDS Analysis Tool (RDSAT Version 5.6) was used to produce population-level proportions and 95% confidence intervals weighted for network sizes and recruitment patterns. To test statistical differences between the male sex workers and other MSM, we used the adjusted point estimates and their confidence intervals to calculate a z-score and its associated P-value[14]; the z-test has been applied to RDS data previously.[15] Visual analysis of network recruitment and network diagram were produced

using NetDraw Software for Network Visualization (Analytic Technologies, Lexington, KY). For the visual analysis, sex workers were further stratified into the 2 subgroups described above (sold sex in the past 2 months, sex work reported as occupation).

Ethical Approval

The study protocol was approved by the Kenyatta National Hospital Ethics and Research Committee, the Population Council Institutional Review Board, and the CDC. Representatives of local MSM interest or advocacy groups were consulted during design, implementation, and interpretation and dissemination of findings.

RESULTS

A total of 563 MSM were recruited through 6 seeds to participate in the study, of which 273 (48.5% crude, 39.6% RDS-adjusted) met the definition of having sold sex. The remaining 290 MSM participants did not report any recent history of selling sex. Figure 1 illustrates the network recruitment chains; the majority of study participants were recruited by 2 of the 6 seeds. As demonstrated in the diagram, sex workers were well-integrated into the recruitment networks of non-sex worker MSM.

MSM who did not report selling sex and those who did sell sex did not significantly differ by age, possible alcohol dependence, or drug use (Table 1). Sex workers were significantly less likely to be currently married (7.6% versus 16.8%, $P = 0.014$) and to have been educated beyond secondary school (1.0% versus 21.1%, $P < 0.001$). A majority of all participants had completed primary school or a higher level of education.

Male sex workers were significantly more likely to have had receptive anal intercourse (RAI) with 3 or more male partners (65.7% versus 18.0%, $P < 0.001$) and unprotected RAI with partners (40.0% versus 22.8%, $P = 0.005$) than non-sex workers. Further, male sex workers were significantly more likely to have had insertive anal sex with 3 or more male sexual partners than non-sex workers (53.5% versus 36.7%, $P = 0.007$). About half of all MSM reported having had sex with a recent female partner, and MSM who did not sell sex were significantly more likely to have had only 1 female partner (30.2%) than male sex workers (13.9%, $P = 0.002$) (Table 1).

More than 60% of both groups had ever been tested for HIV and more than 34% of both groups had been tested for HIV within the past 12 months. Of 144 total MSM who tested positive for HIV, a higher percentage of male sex workers (77.3%, n = 86) were unaware of their HIV status compared with MSM who did not sell sex (51.9%, n = 58), although this was not statistically significant ($P = 0.158$).

Male sex workers were significantly more likely than non-sex workers to report victimization to verbal (57.7% versus 23.1%, $P < 0.001$), physical (15.1% versus 0.8%, $P < 0.001$), and sexual violence (10.0% versus 2.5%, P = 0.013). Discrimination (refusal of health care, employment, education, religious service, restaurant/bar service, housing, and/or police services) was also more often reported in the past year by sex workers than non-sex workers (36.5% versus 14.7%, $P < 0.001$).

HIV prevalence among all MSM in this study (sex workers and non sex-worker MSM) was 18.2% (95% confidence interval: 13.1 to 23.6, data not shown). A significantly higher proportion of male sex workers were HIV infected (26.3%) than non-sex workers (12.2%, $P = 0.007$). Prevalence of syphilis, gonorrhea, or chlamydia did not significantly differ between the groups. However, prevalence of testing positive for 1 or more of these 3 STIs combined among MSM who sold sex (15.0%) was higher than among MSM who did not sell sex (5.3%, $P = 0.009$) (Table 1). STI infections were highest among participants practicing RAI, as rectal gonorrhea and chlamydia respectively measured at 5.6% and 3.2% among non-sex worker MSM and 5.0% and 4.3% among male sex workers.

DISCUSSION

This was the first probability-based surveillance survey of MSM in Nairobi, Kenya. Among male sex workers, HIV prevalence was more than twice as high as among non-sex workers, yet HIV prevalence among non-sex workers was still considerably higher than among adult men living in Nairobi (3.4%) and among all adult men in Kenya (4.6%) in 2008–09.[16]

This raises questions regarding the role of male sex workers and other MSM within the broader HIV epidemic in Nairobi. Participants in this study both reported recent female sexual partnerships—including unprotected vaginal or insertive anal sex with female wives or other women. However, recent phylogenetic analysis from Senegal and Kenya suggests that MSM epidemics have distinct characteristics, with established yet limited connections with HIV infections in general populations.[17–19] More sexual network analysis would be needed to understand transmission dynamics among MSM and other populations in Nairobi. The networks analyzed here only reflect social interaction in the context of RDS recruitment, and we could not assess the extent of actual sexual partnerships between the male sex workers and other MSM.

Increased vulnerability to HIV among male sex workers compared with non-sex worker MSM may be because of differences in risk behavior, including a higher number of reported receptive anal sex partners and unprotected anal sex exposures. This may be compounded by their increased exposure to the various types of abuses or assaults and overall stigma and discrimination. We observed high rates of undiagnosed HIV infection, and a majority of participants (>60%) did not test for HIV in the past year, indicating a strong need for testing promotion among all MSM and particularly sex workers. There is a need to develop targeted HIV prevention, care, and treatment programs that are appropriate for this population. Relatively high levels of educational achievement by these populations indicate good potential for intervention comprehension and uptake. Program planners should also consider that while sex worker and non-sex worker MSM have different levels of STI prevalence and risk behaviors, they remain socially well connected. Therefore, each subgroup needs outreach programs that take into account their social network dynamics.

Kenya's national HIV/AIDS response has acknowledged the importance of addressing MSM in HIV programming.[20] However, gaps remain in prevention knowledge and program implementation for MSM subgroups. Future HIV prevention programs must address structural issues and interventions that may decrease homophobia, violence, and

discrimination. We also need to better understand care and treatment practices among MSM, particularly because of recent findings suggesting that pre-exposure prophylaxis, antiretroviral treatment, and presumptive treatment of STIs may be viable prevention strategies for MSM.[21–23]

There are several documented limitations to using the RDS sampling methodology, regarding its reliability in estimating true representative results and accurate variance.[24] In Kenya, fear of public exposure because of the illegal status of homosexuality and general homophobia may have deterred some eligible men from participating in this study. MSM who sell sex may be more in need of support services that a study may facilitate and thus more likely to participate than MSM who do not sell sex, leading to possible bias and limited generalizability of biological and/or behavioral estimates. Furthermore, results from this study in Nairobi are likely not generalizable to MSM living in other areas in Kenya. Finally, we relied on self-report for all behaviors and demographics and these data may be subject to social desirability bias.

In conclusion, this study highlights the vulnerability of all MSM in Kenya and the need for stronger overall programmatic and structural responses. The MSM subgroups of sex workers and their sexual partners, however, are at substantially higher risk, and we therefore recommend targeting male sex workers more aggressively with effective interventions, including pre-exposure prophylaxis and presumptive treatment of STIs.

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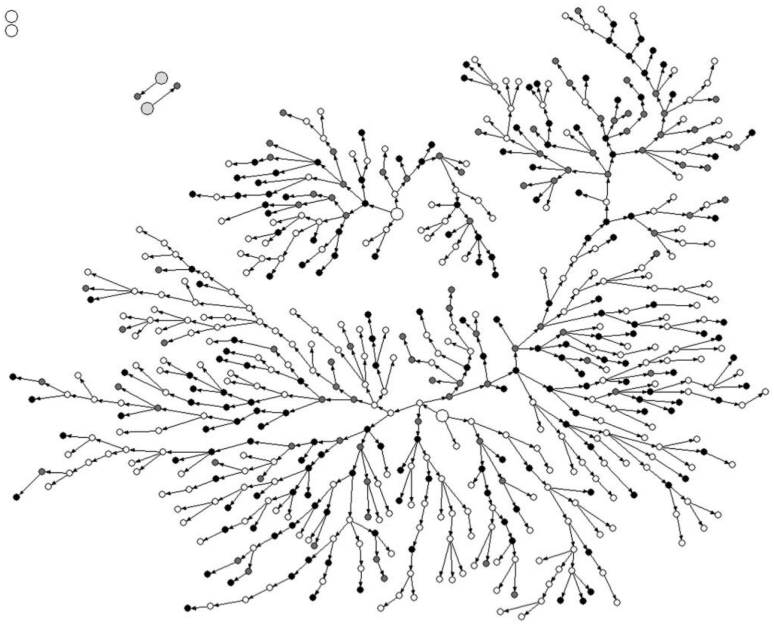

FIGURE 1.

Network diagram of MSM recruitment chain referral, by sex work status. Large circles, RDS seeds (n = 6); small circles, recruited respondents (n = 563). White: MSM who did not report any sex work (n = 290, 4 seeds). Gray: MSM who reported selling sex in the past 2 months but did not report sex work as occupation (n = 180, 2 seeds). Black: MSM who reported sex work as main occupation (n = 93).

TABLE 1

Comparison of Characteristics of MSM Who did not Sell Sex and MSM Who Sold Sex in Nairobi, Kenya, 2010

	MSM Who did not Sell Sex (n = 290)		MSM Who Sold Sex (n = 273)		
	n (Crude %)	Adjusted % (95% CI)	n (Crude %)	Adjusted % (95% CI)	*z* (*P*)*
Basic characteristics					
Age group (yrs)					
18–24	78 (26.9)	33.4 (23.8 to 42.2)	78 (28.6)	34.4 (25.6 to 43.7)	0.15 (0.879)
25–29	78 (26.9)	20.6 (14.8 to 29.4)	84 (30.8)	30.4 (22.2 to 40.4)	1.65 (0.100)
30–34	47 (16.2)	15.4 (9.0 to 21.4)	54 (19.8)	15.3 (9.6 to 21.3)	0.02 (0.982)
35 and older	87 (30.0)	30.6 (21.4 to 40.1)	57 (20.9)	19.8 (12.8 to 26.9)	1.81 (0.071)
Marital status (with women)					
Single, never married	168 (57.1)	56.2 (47.4 to 65.3)	168 (61.5)	65.8 (56.2 to 74.7)	1.46 (0.144)
Previously married	74 (25.2)	27.0 (19.3 to 34.8)	77 (28.2)	26.6 (17.9 to 35.5)	0.07 (0.947)
Currently married	52 (17.7)	16.8 (11.1 to 22.9)	28 (10.6)	7.6 (3.9 to 12.6)	**2.45 (0.014)**
Education					
None/incomplete primary/completed primary	93 (31.6)	41.7 (31.6 to 50.3)	111 (40.7)	49.2 (39.3 to 58.2)	1.11 (0.269)
Incomplete or completed secondary	113 (38.4)	37.2 (28.0 to 46.1)	118 (43.2)	40.8 (31.9 to 50.9)	0.54 (0.591)
More than secondary	88 (29.9)	21.1 (15.9 to 29.0)	44 (16.2)	1.0 (0.6 to 1.5)	**6.00 (<0.001)**
Alcohol dependence (AUDIT score)					
0–19, low to possible hazardous use	228 (78.6)	77.4 (69.9 to 85.0)	183 (67.0)	77.3 (69.7 to 83.8)	0.02 (0.985)
20–40, possible alcohol dependence	62 (21.4)	22.6 (15.0 to 30.1)	90 (33.0)	22.7 (16.2 to 30.3)	0.02 (0.985)
Any illicit drug use in the past 12 months	185 (62.9)	67.2 (57.9 to 75.5)	215 (78.7)	77.5 (68.5 to 85.0)	1.67 (0.094)
Sexual behavior					
Age at sexual debut with a man					
Less than 15 yrs old	27 (9.3)	7.3 (3.2 to 12.4)	40 (14.7)	14.6 (8.7 to 21.3)	1.83 (0.067)
15 yrs or older	263 (90.7)	92.7 (87.6 to 96.8)	233 (85.4)	85.4 (78.7 to 91.3)	1.83 (0.067)
No. reported male RAI partners†					
None	158 (54.5)	57.6 (49.0 to 66.6)	49 (18.0)	21.1 (13.5 to 30.2)	**5.90 (<0.001)**
1–2 partners	63 (21.7)	24.4 (16.1 to 32.6)	27 (9.9)	13.2 (6.1 to 19.8)	**2.05 (0.041)**

	MSM Who did not Sell Sex (n = 290)		MSM Who Sold Sex (n = 273)		
	n (Crude %)	Adjusted % (95% CI)	n (Crude %)	Adjusted % (95% CI)	z (*P*)*
3 or more partners	69 (23.8)	18.0 (12.3 to 24.5)	197 (72.2)	65.7 (56.6 to 75.6)	**8.28 (<0.001)**
Reported any URAI with last male partners‡	60 (20.7)	22.8 (15.9 to 30.9)	109 (39.9)	40.0 (31.3 to 49.9)	**2.82 (0.005)**
No. reported male IAI partners†					
None	107 (36.9)	41.0 (32.1 to 49.2)	60 (22.0)	29.0 (20.6 to 39.2)	1.86 (0.063)
1–2 partners	64 (22.1)	22.3 (16.0 to 29.4)	37 (13.6)	17.5 (11.0 to 24.6)	0.99 (0.324)
3 or more partners	119 (41.0)	36.7 (29.8 to 44.7)	176 (64.5)	53.5 (43.4 to 62.5)	**2.72 (0.007)**
Reported any UIAI with last male partners‡	94 (32.4)	31.6 (23.9 to 39.9)	110 (40.3)	35.1 (26.8 to 43.7)	0.59 (0.556)
No. reported female sexual partners†					
None	142 (49.0)	44.9 (36.0 to 53.9)	152 (55.7)	50.0 (40.5 to 59.6)	0.76 (0.445)
1 partner	84 (29.0)	30.2 (22.1 to 38.4)	38 (13.9)	13.9 (8.2 to 20.3)	**3.15 (0.002)**
2 or more partners	64 (22.1)	25.0 (17.5 to 33.3)	83 (30.4)	36.1 (27.0 to 45.5)	1.79 (0.074)
Reported any UVI or UIAI with last female partners‡	61 (21.0)	20.4 (14.2 to 27.2)	39 (14.3)	12.5 (7.7 to 18.1)	1.86 (0.063)
HIV testing					
Ever visited MSM-friendly clinic	72 (24.4)	10.9 (6.5 to 16.1)	100 (36.6)	16.4 (10.1 to 25.2)	1.20 (0.228)
Ever tested for HIV	212 (72.1)	64.3 (57.0 to 73.2)	190 (69.6)	61.6 (50.9 to 70.6)	0.41 (0.678)
Tested for HIV in the past 12 months	139 (47.3)	34.7 (26.8 to 43.2)	129 (47.2)	34.8 (25.5 to 44.5)	0.02 (0.988)
Knowledge of status (HIV-positive MSM, n = 144)					
Aware of HIV status	22 (37.9)	48.1 (17.7 to 73.1)	27 (31.4)	22.7 (4.7 to 48.2)	1.41 (0.157)
Unaware of HIV status	36 (62.1)	51.9 (27.1 to 82.9)	59 (68.6)	77.3 (52.0 to 95.2)	1.41 (0.158)
Violence and discrimination in the past year					
Verbally assaulted	83 (28.2)	23.1 (16.4 to 29.0)	165 (60.4)	57.7 (47.2 to 66.6)	**5.86 (<0.001)**
Physically assaulted	7 (2.4)	0.8 (0.1 to 1.8)	56 (20.5)	15.1 (8.6 to 21.7)	**4.24 (<0.001)**
Sexually assaulted	10 (3.4)	2.5 (0.9 to 4.4)	28 (10.3)	10.0 (5.2 to 16.5)	**2.49 (0.013)**
Refused services§	61 (21.0)	14.7 (9.2 to 20.2)	124 (45.4)	36.5 (25.5 to 44.1)	**3.95 (<0.001)**
HIV and STI prevalence					
HIV	58 (19.7)	12.2 (7.6 to 17.5)	86 (31.5)	26.3 (17.8 to 35.6)	**2.71 (0.007)**
Syphilis	1 (0.3)	0.0 (0.0 to 0.1)	4 (1.5)	1.6 (0.1 to 4.2)	1.53 (0.126)

	MSM Who did not Sell Sex (n = 290)		MSM Who Sold Sex (n = 273)		
	n (Crude %)	Adjusted % (95% CI)	n (Crude %)	Adjusted % (95% CI)	z (*P*)*
Gonorrhea (any)	20 (6.9)	4.2 (1.9 to 6.9)	28 (10.3)	8.8 (4.2 to 14.5)	1.57 (0.115)
Gonorrhea (rectal, all respondents)	13 (4.5)	1.5 (0.4 to 3.6)	16 (5.9)	3.3 (0.3 to 8.2)	0.84 (0.390)
Gonorrhea (rectal, only those who reported RAI partners†)	10 (7.6) (n = 132)	5.6 (1.8 to 11.3)	14 (6.3) (n = 224)	5.0 (2.3 to 9.0)	0.20 (0.840)
Gonorrhea (genital)	10 (3.5)	2.0 (0.7 to 3.7)	15 (5.4)	5.3 (1.6 to 10.7)	1.35 (0.177)
Chlamydia (any)	12 (4.1)	1.7 (0.5 to 3.2)	16 (5.9)	7.7 (2.1 to 14.3)	1.88 (0.060)
Chlamydia (rectal, all respondents)	10 (3.4)	1.5 (0.4 to 3.0)	9 (3.3)	3.3 (0.3 to 8.2)	0.85 (0.396)
Chlamydia (rectal, only those who reported RAI partners†)	7 (5.3) (n = 132)	3.2 (0.7 to 7.2)	8 (3.6) (n = 224)	4.3 (0.5 to 10.4)	0.36 (0.716)
Chlamydia (Genital)	2 (0.69)	2.0 (0.7 to 3.7)	9 (3.3)	5.3 (1.6 to 10.6)	1.36 (0.173)
Any STI (excluding HIV)	31 (10.7)	5.3 (2.8 to 8.0)	44 (16.1)	15.0 (8.5 to 22.1)	**2.61 (0.009)**

AUDIT, alcohol use disorders inventory test; CI, confidence interval; IAI, insertive anal intercourse; RAI, receptive anal intercourse; UIAI, unprotected insertive anal intercourse; URAI, unprotected receptive anal sex; UVI, unprotected vaginal intercourse.

**P*-values in bold highlight statistically significant differences at $P < 0.05$.

†Includes regular partners in the past 12 months, non-regular partners in the past 6 months, and/or paying male clients in the past 2 months.

‡Any reported unprotected intercourse with last regular, last non-regular, and/or paying client.

§Included refusal of health care, employment, education, religious service, restaurant/bar service, housing, and/or police services.